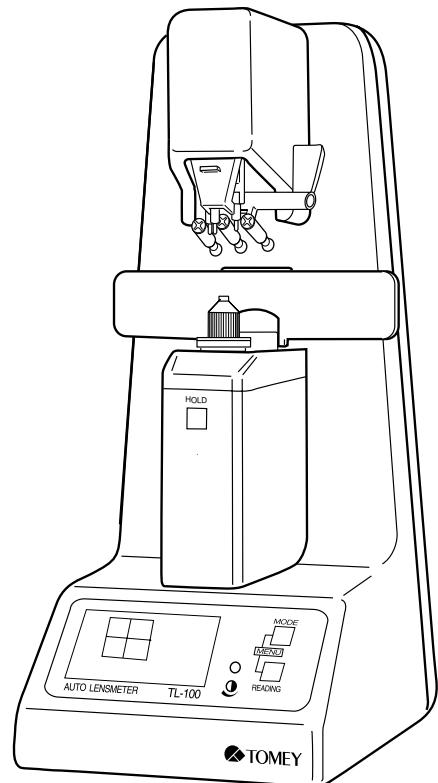


OPERATOR MANUAL

AUTO LENSMETER

TL-100



- Read this Operator Manual carefully before using this instrument in order to operate it properly and safely.
- Do not use procedures other than those specified in this manual.
- Keep this Operator Manual handy when operating this instrument.
- For any questions about this instrument or about this manual, contact your local TOMEY representative.



SYMBOLS USED IN THIS MANUAL

The symbols used in this manual represent the following messages:



- This is a precaution that, if unheeded, will result in a hazardous situation where there is an imminent danger of serious injury or death.



- This is a precaution that, if unheeded, could result in a hazardous situation where there is a possibility of serious injury or death.



- This is a precaution that, if unheeded, may result in a situation where there is a possibility of minor or moderate injury or damage to property.



- This is an additional instruction which may contain a special precaution on company policy related, either directly or indirectly, to the safety of personnel or to the protection of property.

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1. PRIOR TO USE

Notes

- Read this Operator Manual carefully before using this instrument in order to operate it properly and safely.
- Do not use procedures other than those specified in this manual.

1.1 CAUTIONARY NOTES



- Never install this instrument near locations where explosive or flammable materials are used or stored. Such installation may result in a fire or an explosion.



- Only well-trained personnel should operate this instrument.
- When installing this instrument, observe the following items.
 - Do not install this instrument in a location where it might be exposed to water or chemicals.
 - Do not install this instrument in a location where it might be subject to adverse influences, such as excessive atmospheric pressure, high temperature, excessive humidity, poor ventilation, direct sunlight, dust, salt or sulfur in the air.
 - Ascertain that factors such as excessive slope, vibration and impact will not endanger the instrument (including during transportation).
 - Do not install this instrument near the storage of chemical substances or in a location where gas may be generated.
 - Adhere to the specified mains frequency, voltage and allowable current (or allowable power consumption).
- During use of this instrument, observe the following:
 - Do not move a coated lens when it is held with the clamp. This may result in damage to the coating. The clamp should be used only for marking.
 - Clean the cover glass under the nose piece often with a soft cloth.
 - Always keep the tip of the nose piece clean. Dust on it may result in scratches on a lens.



- When this instrument is not in use, keep the dust cover over it.
- When the instrument is not used for an extended period of time, unplug the power cord.
- After using this instrument, observe the following:
 - Do not apply excessive force when unplugging the cords.
 - Refer to the Section 4.4 Storage for storage instructions.
- If you suspect that this instrument is not functioning properly, do not attempt to repair it. Contact your Tomey representative or local distributor.
- Do not modify this instrument.
- Maintenance:
 - Inspect this instrument and its accessories periodically.
 - If this instrument has been idle for a long period of time, confirm that it is functioning properly and safely before using it again. For this, TOMEY recommends using a trial lens set for checking accuracy.
- Due to vibration during transport and/or environmental changes of storage, the ink may leak out of the marking device cartridge. If you find an ink stain and/or leakage of ink at the tip of the marking device, wipe it off and make sure it is functioning properly.

1.2 UNPACKING

Upon unpacking, inspect that all the components are present and that there is no visible damage to any of them.

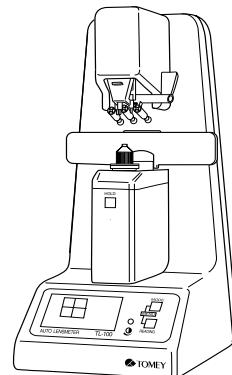
If there are any missing or damaged items, immediately contact your Tomey representative or local distributor.

Note

- Be sure to retain all shipping and packing materials for reuse if the instrument will be transported or shipped.

COMPONENT

- Main unit of the AUTO LENSMETER TL-100 1



- Power Cord 1
- Contact Lens Nose Piece 1
- Spare Fuse (250V, 2.0A) 1
- Dust Cover 1
- Operator Manual (this book) 1

1.3 EXPLANATION OF TERMS

- D Diopter (a unit of measurement referring to the refractive power of a lens; reciprocal of the focal length of the lens in meters)
- Δ Prism diopter (a unit of the measurement of angular deviation of light produced by a lens)
- SPH (S) Spherical refractive power (unit: D, diopter)
- CYL (C) Cylindrical refractive power (unit: D, diopter)
- AXIS (A) The position of minimum or maximum power in a lens that has cylinder power. Axis is measured in degrees and is used to specify the orientation of a lens to correct astigmatism. (unit: degree)
- ADD Additional power of a multi-focal lens (including a progressive addition lens).
- CL Contact lens
- HI mode Measurement mode for high index lens
- Abbe number Number indicating the dispersive power of a lens. The Abbe number of normal lenses is about 60 and that of high index lenses ranges from approximately 30 to 45.
- PSM Prism

1.4 OUTLINE OF OPERATION

The AUTO LENSMETER TL-100 is an instrument for the automatic measurement of refractive and prism power of spectacles and contact lenses.

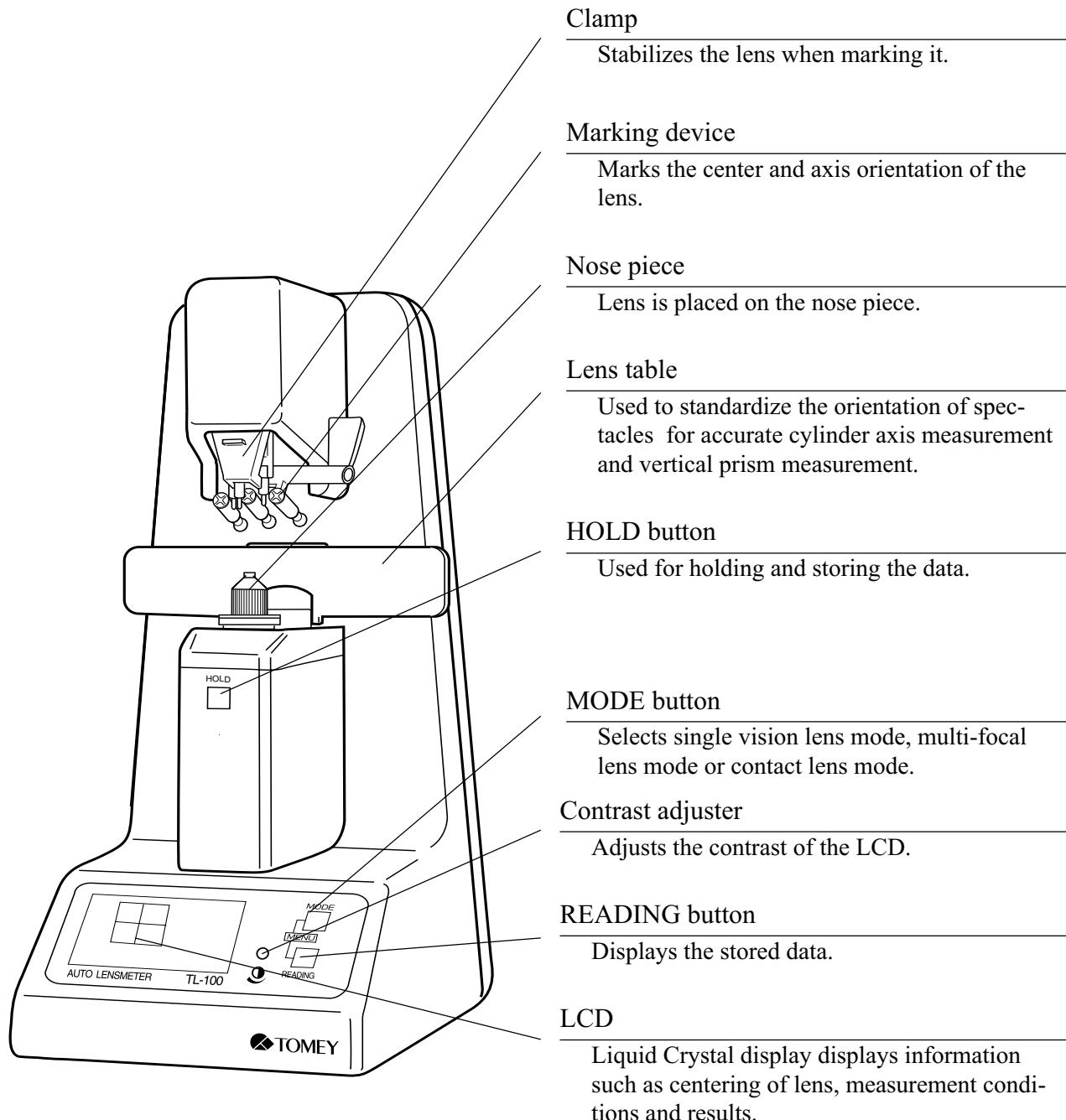
The TL-100 is composed of a built-in optical system, an electronic processing system, and a mechanical system.

Placing spectacles or contact lenses on the nose piece initiates automatic measurement. The results are displayed on the LCD.

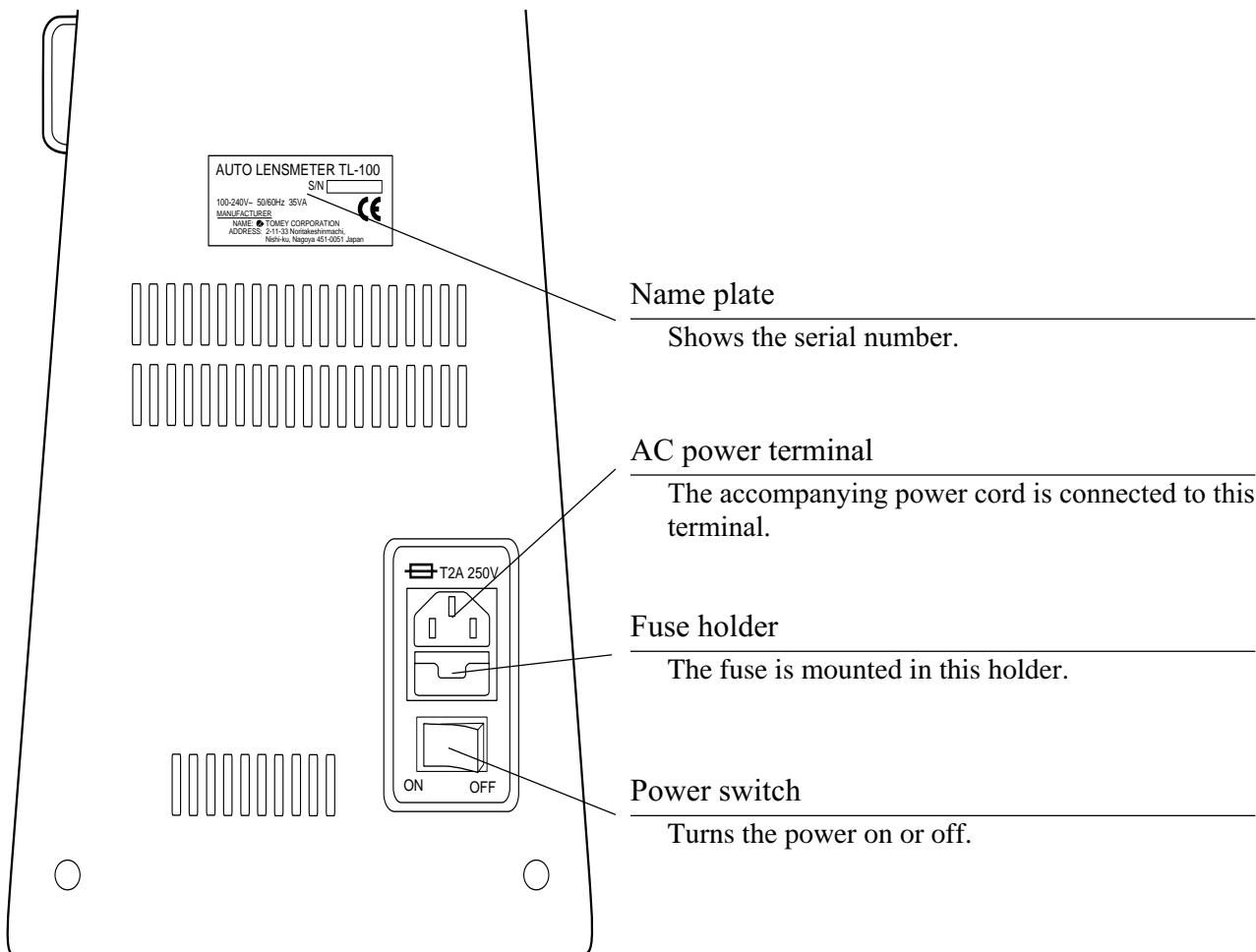
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2. COMPONENT LIST AND FUNCTIONS

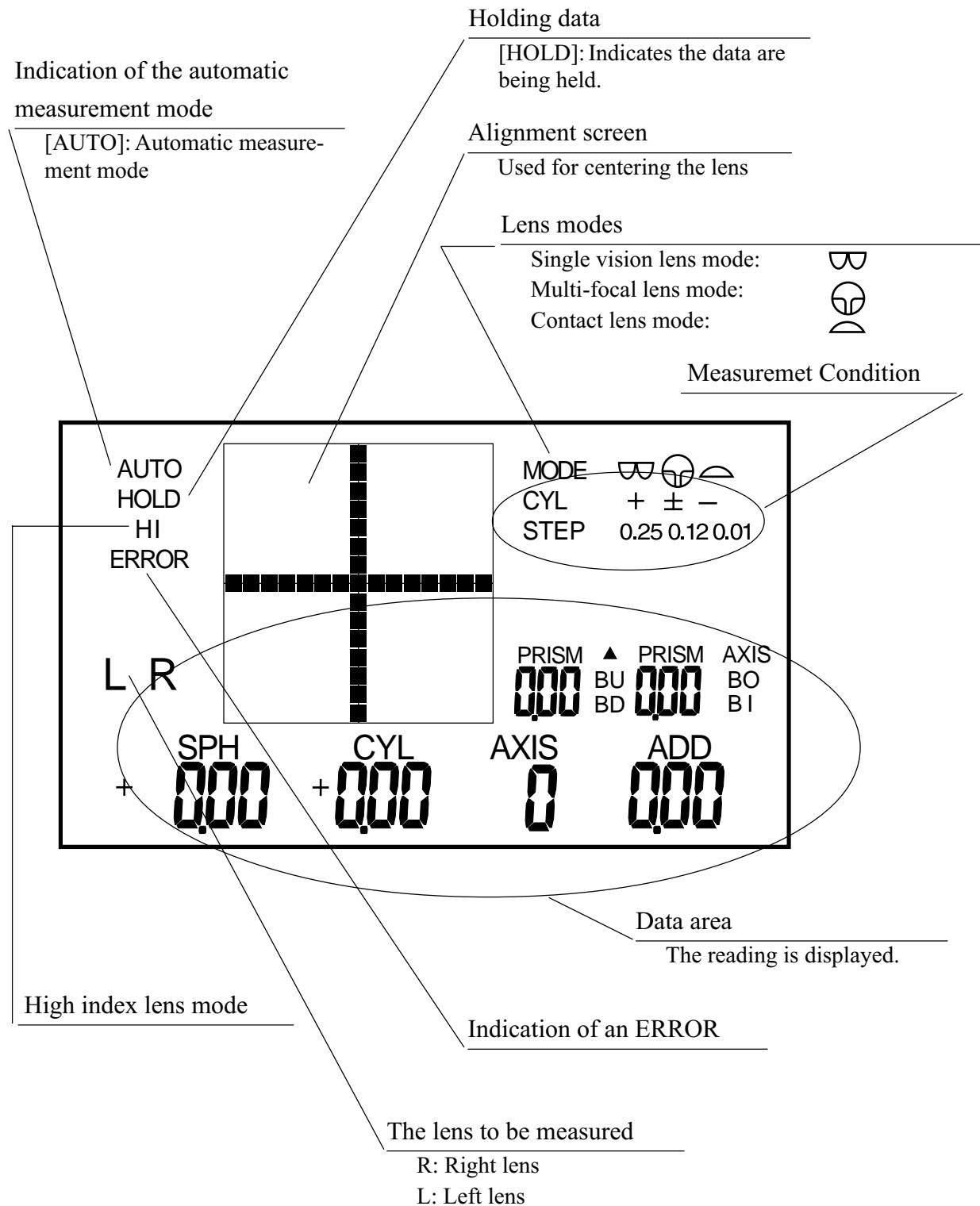
2.1 FRONT



2.2 BACK



2.3 SCREEN LAYOUT



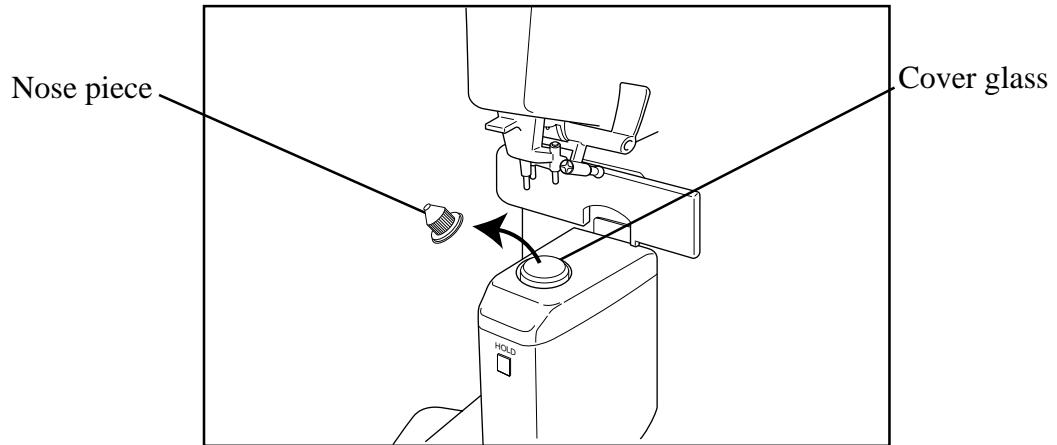
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3. METHOD OF OPERATION

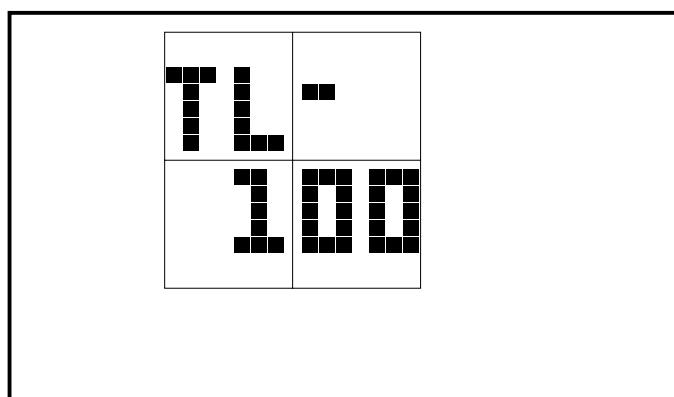
3.1 Preparation for operating



- **Before turning on the power, check the following items:**
- Make sure that the cover glass under the nose piece is clean.
- Make sure that the nose piece seated properly.
- Make sure a lens is not on the nose piece.

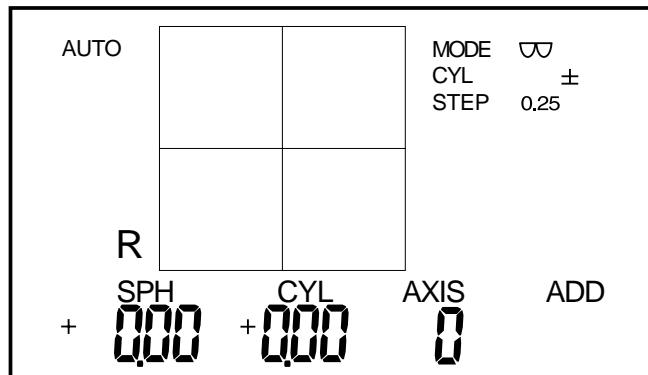


- 1) Connect the female end of the power cord into the power terminal on the back of the TL-100 and the male end into a 3-prong power outlet.
- 2) Turn the power switch ON.



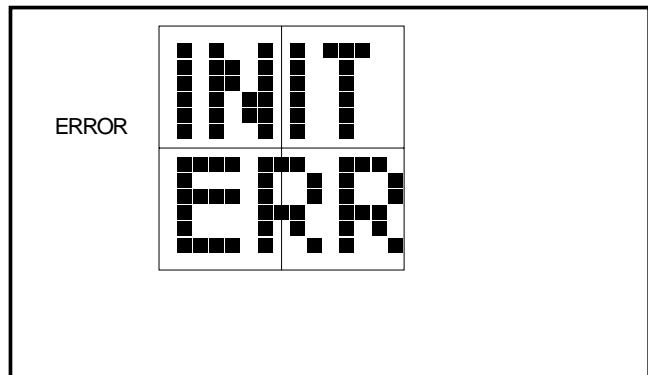
- 3) The initial screen will appear for approximately five seconds.

4) The measurement screen will appear.



Notes

- Do not place a lens onto the nose piece until after the measurement screen appears.
- Turning the instrument on with the lens already on the nose piece initiates a beep and indicates "INITIAL ERROR" on the LCD. Remove the lens from the nose piece, then press any button to proceed.



3.2 MEASURING METHODS

3.2.1 MEASURING SINGLE VISION LENSES

If the instrument is not in Single Vision mode (VV), change to Single Vision mode by pressing the MODE button. Single Vision mode (VV), Multi-focal mode (P) and Contact Lens mode (C) are set consecutively each time the MODE button is pressed.

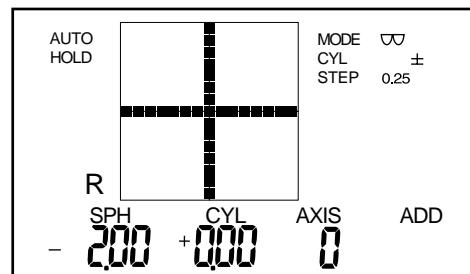
a) Automatic Hold Mode

In the automatic hold mode, readings are automatically held when the lens is properly aligned.

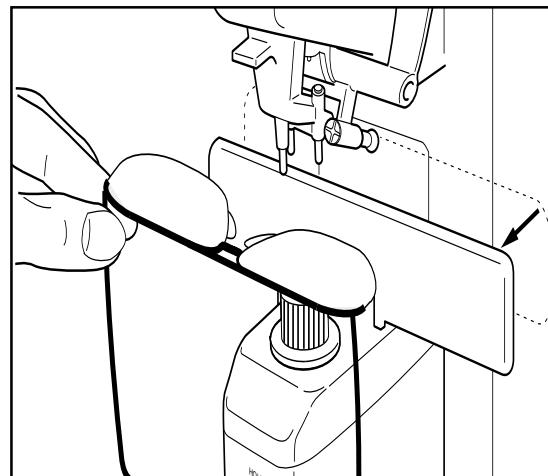


- **Thrusting a lens onto the nose piece or moving a lens quickly may result in damage to the lens.**

- 1) If the instrument is in manual hold mode and you wish to use automatic (AUTO) hold mode, press the HOLD button for approximately 1 second until "AUTO" appears at the upper left of the screen.



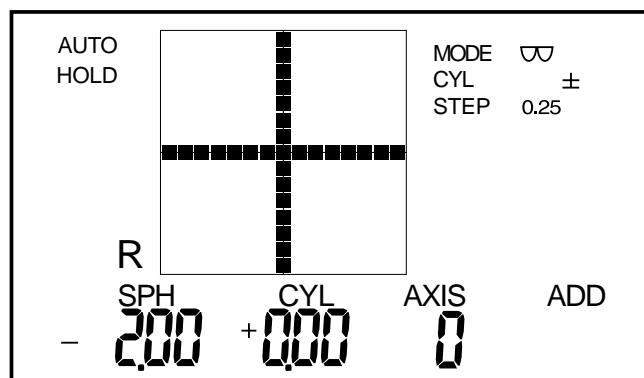
- 2) Place the right lens on the nose piece with the bottom of the frame away from you and the temple downward (as shown below).



Note

- The right lens must be measured first and then the left lens.

- 3) Move the lens gently right and left, back and forth to center the cursor (+) on the crosshair. The reading will be displayed in real time.
- 4) When alignment is achieved, a beep will sound and the reading will be automatically held.



- 5) When the right lens is removed from the nose piece, the instrument is ready to measure the left lens.
- 6) Place the left lens on the nose piece as described in step 2 and follow steps 3-4.

Notes

- When the left lens is placed on the nose piece, "HOLD" will disappear from the screen. However, the right lens data will be retained, and if the Output button is pressed after measuring the left lens, data for both lenses will be displayed.

b) Manual Hold Mode

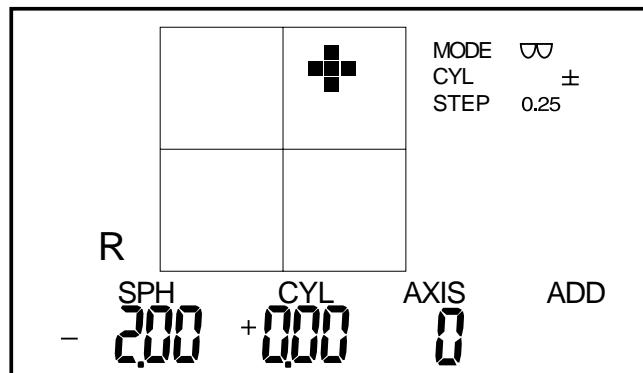


- **Thrusting the lens onto the nose piece or moving the lens quickly may result in damage to the lens.**

- 1) If the instrument is in automatic (AUTO) hold mode and you wish to change to manual hold mode, press the HOLD button (located below the nose piece) for approximately 1 second, until "AUTO" disappears from the display.
- 2) Place the right lens on the nose piece with the bottom of the frame away from you and the temples downward (as shown on page 3-3).

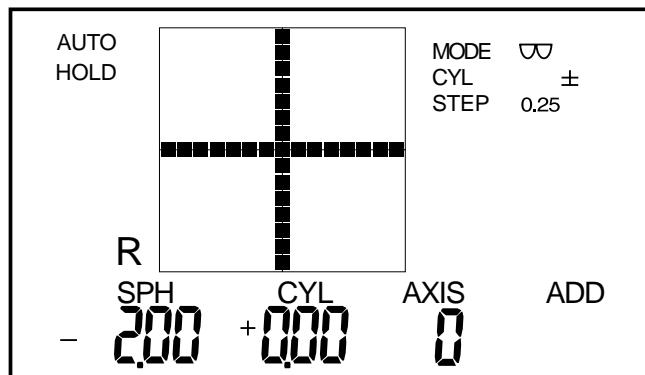


- **The right lens must be measured first and then the left lens.**



- 3) Move the lens gently right and left, back and forth to center the cursor (+) on the crosshair. The reading will be displayed in the data area in real time.

-
- 4) When alignment is achieved, press the HOLD button. The reading will be held, and "HOLD" will be displayed at the top left of the screen.



- 5) When the right lens is removed from the nose piece, the instrument is ready to measure the left lens.
- 6) Place the left lens on the nose piece as described in step 2 and follow steps 3-4.

Note

- When the left lens is placed on the nose piece, "HOLD" will disappear from the screen. However, the right lens data will be retained, and if the Output button is pressed after measuring the left lens, data for both lenses will be displayed.

3.2.2 MEASURING MULTI-FOCAL LENSES (MULTI-FOCAL MODE)

The MULTI-FOCAL mode is used for measuring both progressive addition lenses and bi-focal lenses.

Notes

- Refer to the Section 5.1 "Troubleshooting guide" for details of measuring in the MULTI-FOCAL mode.
- In AUTO mode, the add reading is automatically held. Press the HOLD button for approximately 1 second without placing a lens on the nose piece to switch the mode between AUTO and MANUAL.

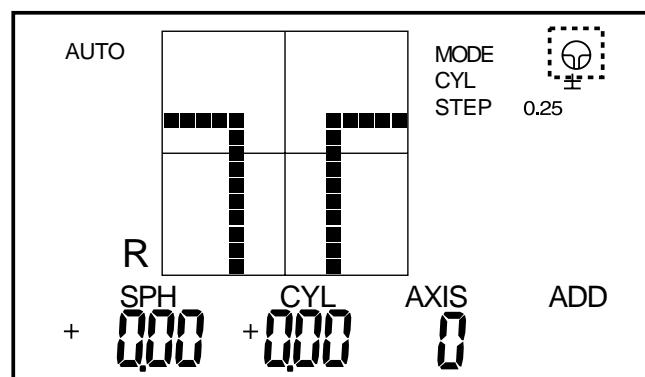


- Thrusting a lens onto the nose piece or moving a lens quickly may result in damage to the lens.

a) Measuring Progressive Addition Lenses

- 1) Change to Multi-Focal mode () by pressing the MODE button.

Single Vision mode (), Multi-focal mode (), and Contact Lens mode () are set consecutively each time the MODE button is pressed.



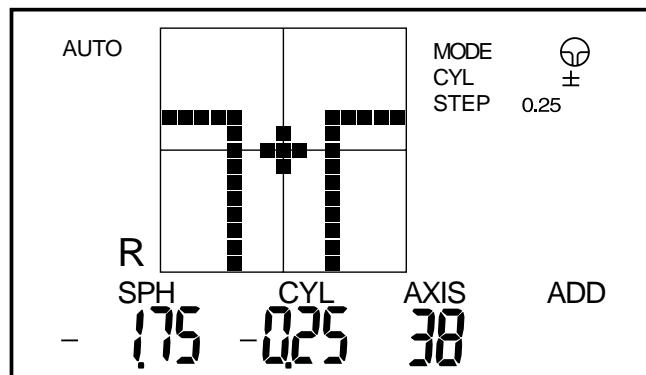
- 2) Locate the progressive (near) area.

- a. Place the right lens on the nose piece so that the progressive area is positioned away from you, as illustrated on p.3-3. The progressive channel normally starts at the middle of the lens (vertically) and extends downward.

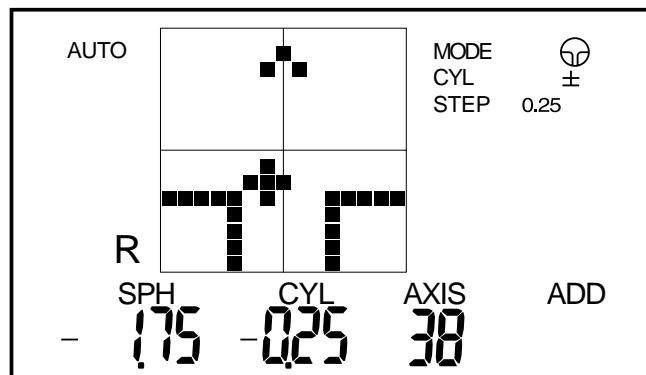
Note

- The right lens must be measured first and then the left lens.

- b. Move the lens gently right and left, back and forth to align the cursor (+) on the crosshair.



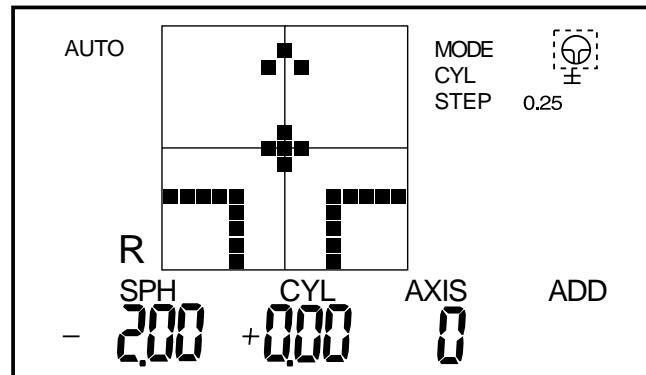
- c. When the center of the near portion is found, a beep will sound, following which the measurement display will change for the measurement of the distance portion of the lens.

**Note**

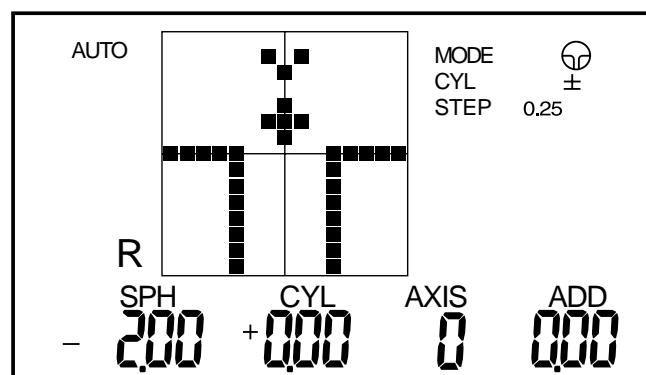
- If the add is low, the center of the near zone may not be detected. Align the geometrical center of the lens on the crossbar and press the HOLD button.

3) Measure the Distance Zone

- a. Move the lens away from you to place the distance zone over the nose piece. Move the lens gently right and left, back and forth to align the cursor (+) on the crosshair.



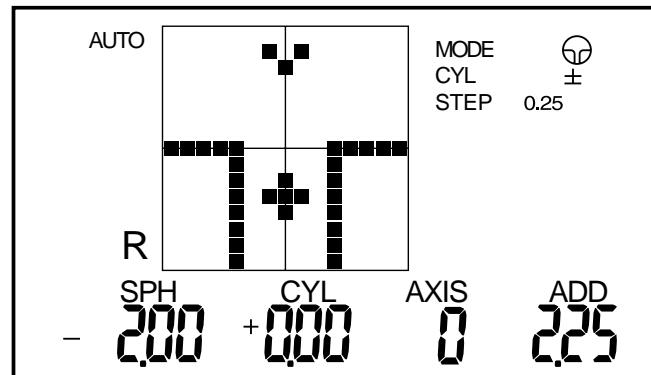
- b. If AUTO HOLD is ON, when the cursor (+) is centered, a beep will sound, and the reading at the distance zone will be held automatically. If AUTO HOLD is OFF, the reading of the far point area will not be held automatically and it is necessary to press the HOLD button when alignment is achieved. (See Section 3.4, Setup to change the AUTO HOLD setting.)
- c. The measurement display will change for measurement of the near zone.

**Note**

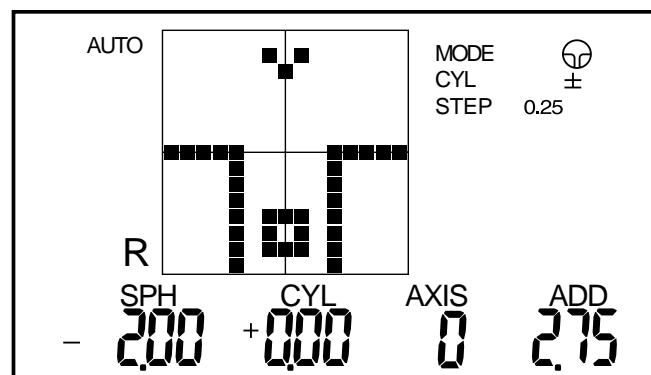
- In some lenses, the center may not be detected. If this occurs, move the lens back and forth, right and left with the area located about 6 to 10 mm above the center of the lens over the nose piece to find the spot with the minimal variation in SPH and CYL readings. When this location is found, press the HOLD button.

4) Measuring at the Near Zone

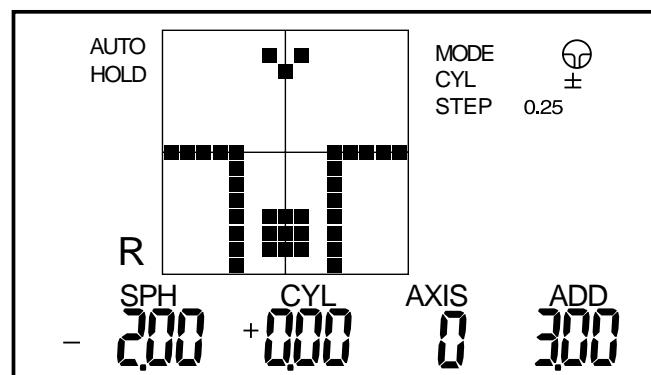
- a. ADD will be indicated on the screen.
- b. Move the frame toward you, and move it right and left so that the cross cursor (+) always stays in the progressive channel.



- c. The cross cursor "⊕" changes to "■" when the location of the near zone is approximated.



- d. When the near point is found, the cursor wil change to "■■■".



-
- e. In AUTO mode, a beep will sound, and the ADD reading will be held automatically. In Manual mode, press the HOLD button.

If the near zone of a progressive addition lens is located very close to the frame, the cross cursor (+) may not change to "■■■" and then to "■■■". In such a case, regard the area with the highest addition reading in the progressive channel as the near point. Press the HOLD button manually to store the ADD reading.

- 5) When the right lens is removed from the nose piece, the instrument is ready to measure the left lens.
- 6) Place the left lens on the nose piece as described in step 2a and follow steps 2b-4.

Note

- When the left lens is placed on the nose piece, "HOLD" will disappear from the screen. However, the right lens data will be retained, and if the READING button is pressed after measuring the left lens, data for both lenses will be displayed.

b) Measuring Bifocal Lenses



- **Thrusting a lens onto the nose piece or moving a lens quickly may result in damage to the lens.**



- **In AUTO mode, the ADD reading is automatically held . Press the HOLD button for approximately 1 second without placing a lens on the nose piece to switch the mode between AUTO and MANUAL.**

1) Change to Multi-Focal (PROG) mode by pressing the MODE button.

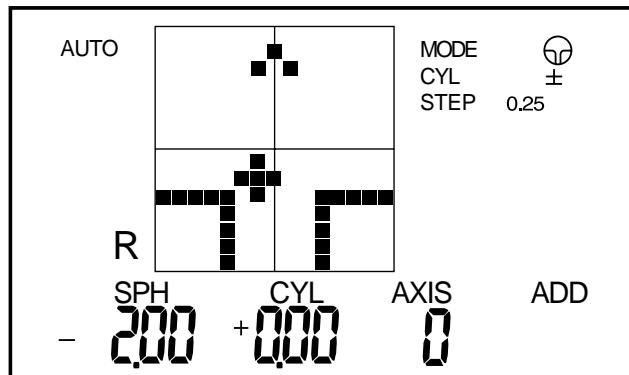
Single Vison mode (), Multi-Focal mode (), and Contact Lens mode () are set consecutively each time the MODE button is pushed.

2) Place the right lens onto the nose piece with the add segment positioned away from you and with the distance (upper) portion of the lens over the nose piece.



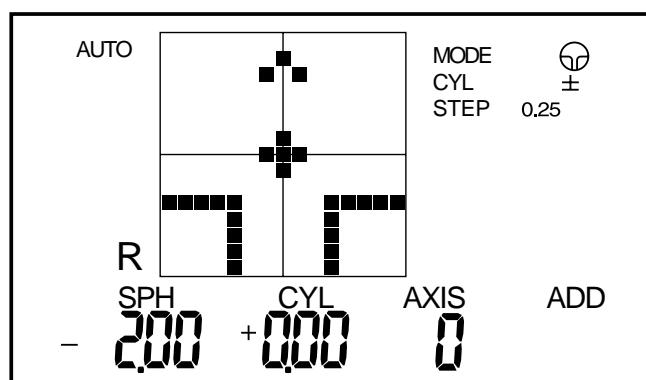
- **The right lens must be measured first and then the left lens.**

3) Press the HOLD button once to change the screen for measuring the distance zone.

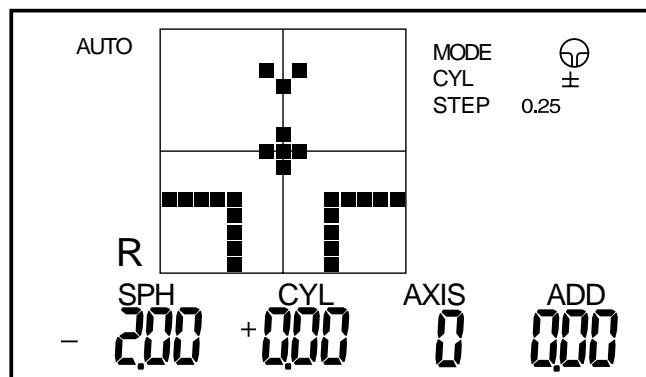


4) Measure the Distance Zone

- a. Move the lens gently right and left, back and forth to align the cursor ("+" mark) on the crosshair.
- b. If AUTO HOLD is ON, when the cursor is aligned, a beep will sound, and the reading of the distance zone will be held automatically. If AUTO HOLD is OFF, press the HOLD button when alignment is achieved. (See section 3.4, Setup to change the AUTO HOLD setting.)

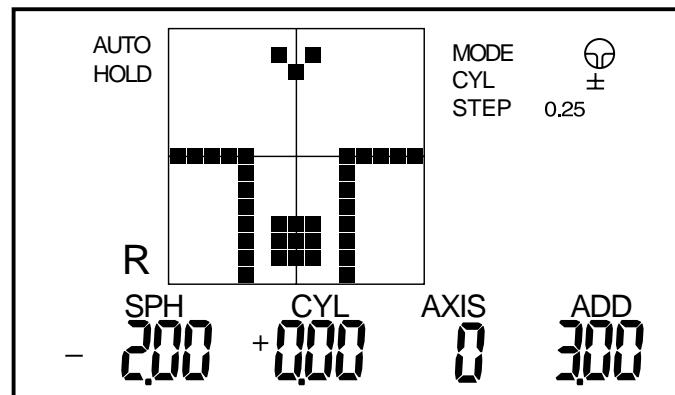


- c. The screen will change for measuring the near zone.



5) Measure the Near Zone

- a. ADD will be indicated on the screen.
- b. Move the lens toward you so that the add segment is positioned over the nose piece.
- c. The cursor mark will change to "■■■" when the near point is found.



- 6) When the left lens is removed from the nose piece, the instrument is ready to measure the left lens.
- 7) Place the left lens on the nose piece as described in step 2 and follow steps 3-5.

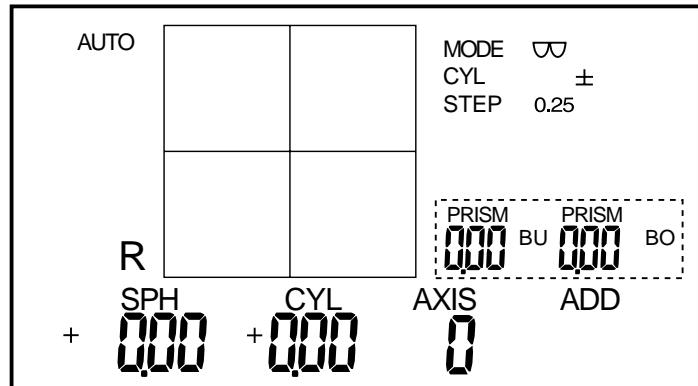
Note

- When the left lens is placed on the nose piece, "HOLD" will disappear from the screen. However, the right lens data will be retained, and if the READING button is pressed after measuring the left lens, data for both lenses will be displayed.

3.2.3 MEASURING PRISM

To measure prism, select one of the prism measurement options described below (See Section 3.4, Setup).

The prism readings are displayed on each side of the display.



There are two prism modes:

Rectangular Coordinates

Prism magnitude is expressed in prism diopters.

Prism base direction is expressed as:

BO/BI : base out or in

BU/BD: base up or down

Polar Coordinates

▲ : prism magnitude expressed in prism diopters

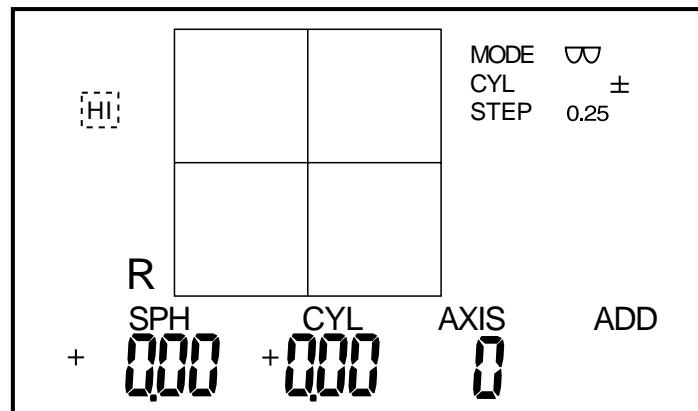
AXIS : base orientation in degrees

3.2.4 MEASURING HIGH INDEX LENSES (HI MODE)

Note

- It is recommended to use the High Index (HI) mode when measuring high index lenses.

- 1) The default Abbe value for normal index lenses is 60. When the instrument is set in HI mode, the default Abbe number is 35. The Abbe number used for HI mode may be changed, as described in Section 3.4, Setup.
- 2) To activate HI mode, press and hold the MODE button for approximately 1 second until "HI" is indicated at the upper left of the display.



- 3) Follow the instructions for measuring lenses in Sections 3.2.1-3.2.3

Note

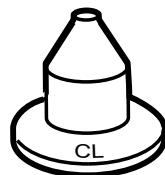
- To return to Normal Mode, press the MODE button for approximately 1 second until the "HI" indicator disappears.

3.2.5 MEASURING CONTACT LENSES (CL MODE)

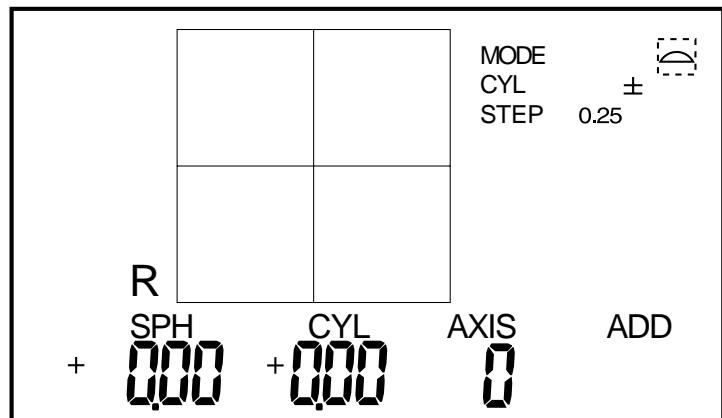
Note

- Be sure to use Contact Lens mode (CL mode) when measuring contact lenses. Measuring in Spectacle mode may result in errors because the measurement conditions for contact lenses are different from those for spectacles.

- 1) Remove the standard nose piece and install the Contact Lens nose piece.



- 2) Choose the CL mode by pressing the MODE button. Single Vision mode (□), Multi-Focal mode (◐), and Contact Lens mode (◓) are set consecutively each time the MODE button is pressed.



a) Hard Contact Lenses

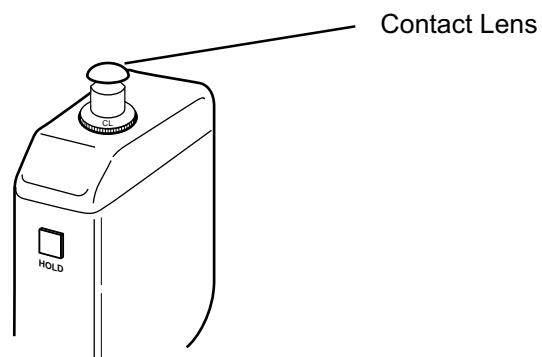
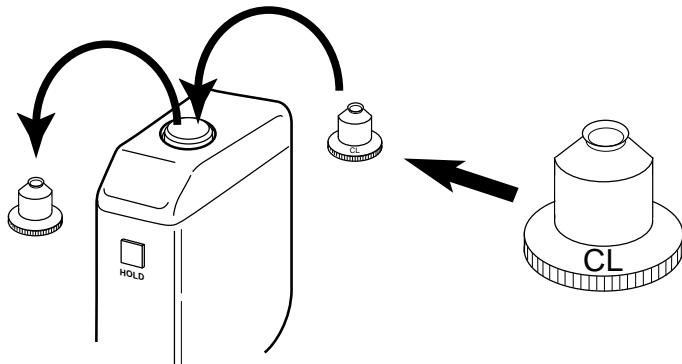
- 1) Place the contact lens on the nose piece with the front (convex) surface upward.
- 2) Move the lens back/forth and left/right for centering. Refer to Section 3.2.1, Measuring single vision lenses, for measurement procedures.

b) Soft Contact Lenses

Note

- Due to the physical properties of soft contact lenses, the reading may not be accurate.

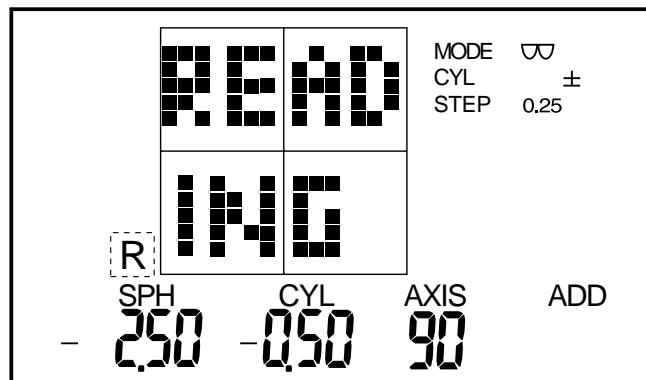
- 1) Wipe off water from the soft contact lens.
- 2) Place the contact lens on the nose piece with the front (convex) surface upward.
- 3) Move the lens back/forth and left/right to center it. Refer to Section 3.2.1, Measuring single vision lenses, for measurement procedures.



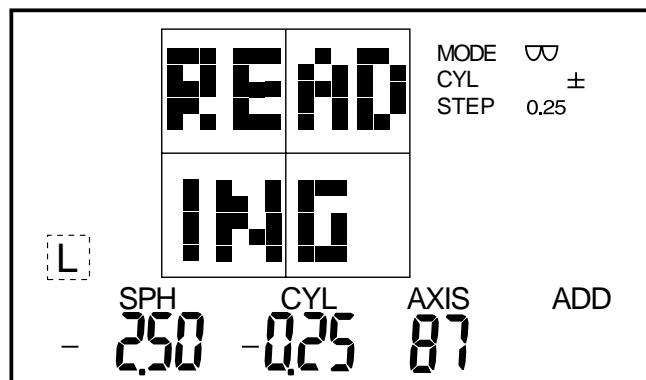
3.2.6 RECALLING THE READINGS (READING)

One right lens measurement and one left lens measurement are temporarily stored in the memory. These readings can be recalled and displayed by pressing the READING button.

- 1) After measuring the lens, press the READING button.
- 2) The reading obtained for the right lens will be displayed first.



- 3) Press the READING button again.
- 4) The reading obtained for the left lens will be displayed next.



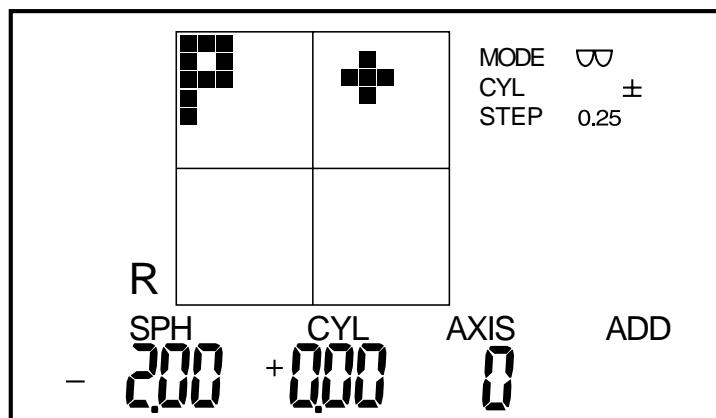
- 5) To return to measurement mode, press the READING button again.

Notes

- If no readings have been stored, nothing will be displayed when the READING button is pressed.
- To return to the measurement display, remove the lens from the nose piece and either place a lens on the nose piece again or press any button, except the READING button.
- Previously stored readings will stay in memory until new readings are stored , either by pushing the HOLD button in MANUAL mode or automatically in AUTO mode.

3.2.7 DETECTING PROGRESSIVE LENSES

When the instrument is in single Vision mode and a progressive lens is placed on the nose piece, the symbol “P” is displayed at upper left corner of the screen.



When the AUTO PROG setting is enabled (see Section 3.4, Setup), the MULTI-FOCAL mode will be automatically activated. See Section 3.2.2 a), Measuring progressive addition lenses.

Notes

- Use the center of the lens to detect the progressive channel. The progressive channel may not be detected in peripheral areas.
- A progressive lens with a low ADD power may not be recognized as a progressive lens.

3.3 OPERATING THE CLAMP, MARKING DEVICE AND LENS TABLE

3.3.1 CLAMP

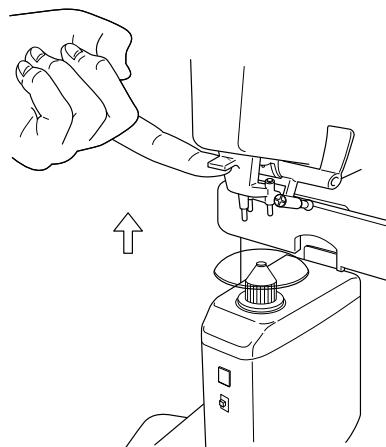


- Lower the clamp slowly. Quick lowering of the clamp may result in damage to the lens.

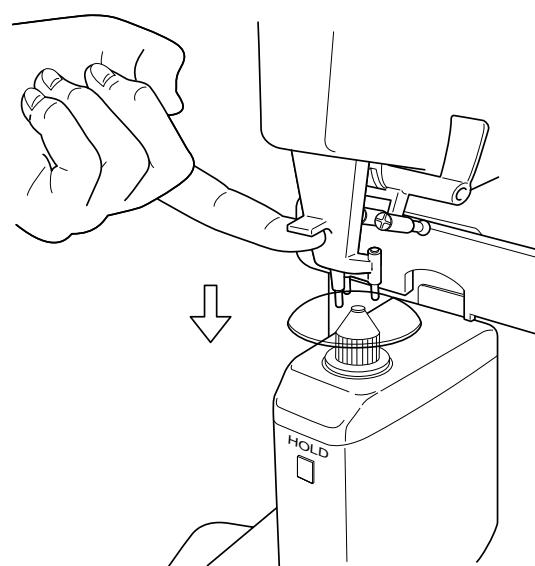
The clamp is used to stabilize the position of the lens when marking it.

(Refer to Section 3.3.2 "Marking device.")

- 1) Raise the clamp upward with your finger to release the lock.



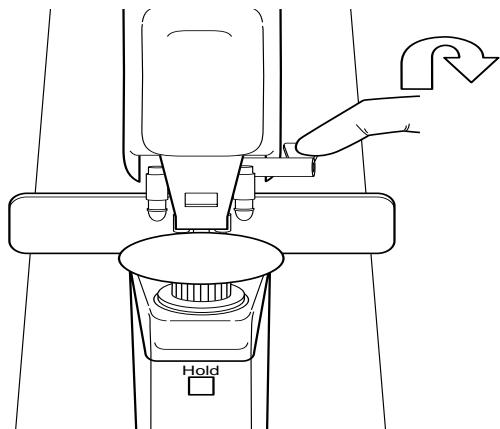
- 2) Lower the clamp gently onto the lens.



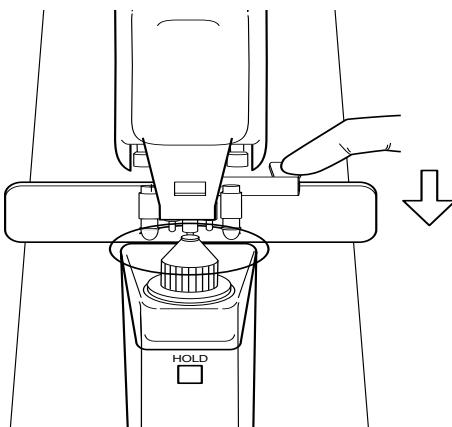
3.3.2 MARKING DEVICE

The marking device places three marks on the lens, one in the center of the lens and one approximately 16 mm lateral to the center on each side along the lens axis.

- 1) Press and turn the marking lever, causing the pens to descend and mark the lens surface.



- 2) Carefully release the marking lever, so it will return to its initial position by its spring force.

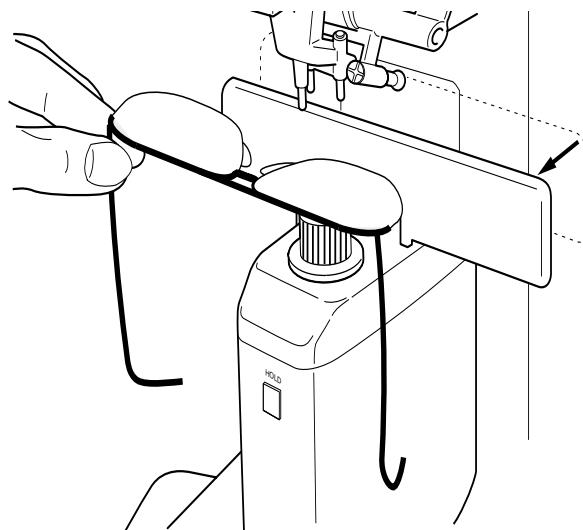


The three (3) marking pens are self-contained cartridges. When the ink supply becomes depleted, replace the cartridge. (See Section 4.3.2, Ink cartridge.)

3.3.3 LENS TABLE

The lens table serves to standardize the axis of cylindrical lenses and the height of the frame for measuring vertical prism.

- 1) Adjust the lens table so that it meets bottom edge of the frame by pushing or pulling it.



- 2) The outer diameter of the lens is indicated on the scale on the upper surface of the nose section.

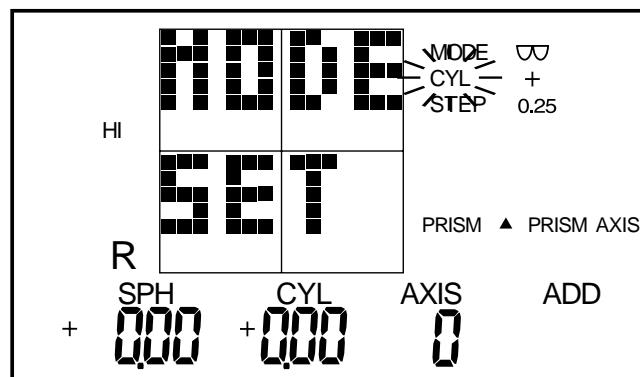
3.4 SETUP

Indication units and measurement conditions may be selected and modified in the MENU MODE.

The highlighted menu indicates that it has been selected.

- 1) Simultaneously press the MODE button and the READING button to enter the MENU MODE.

The screen will change to SETUP and "CYL" will flash on and off at the upper right corner of the screen.



- 2) Select the parameter you wish to modify by pressing the MODE button. Scroll through the following setup options by successively pressing the MODE button: CYL, STEP, PRISM, ABBE NUMBER.
- 3) Select the desired setting by pressing the READING button. Scroll through the options by successively pressing the READING button.

The following parameters may be set in SETUP.

a. CYL notation

- : minus reading
- ± : mixed reading
(In this mode, the Sphere reading is minimized)
- + : plus reading

b. STEP size

- 0.25 : 0.25D step
- 0.12 : 0.12D step
- 0.01 : 0.01D step

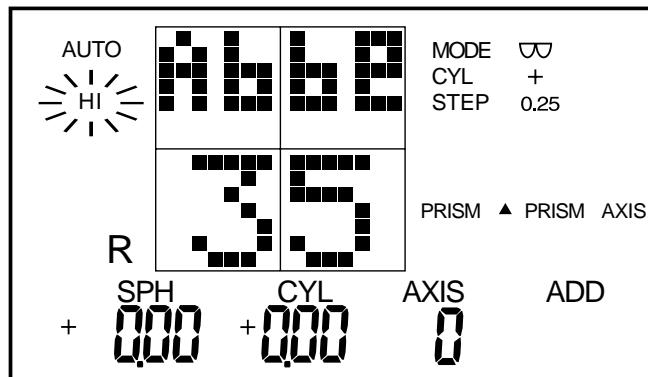
c. PSM coordinates

- (no indication) : no prism display
- BU,BO: rectangular coordinates
- Δ, AXIS: polar coordinates

d. ABBE NUMBER

The Abbe number in the normal mode is 60 (fixed value).

The Abbe number in the HI mode may be changed in increments of 5 ranging from 30 to 60 (Default setting: 35).

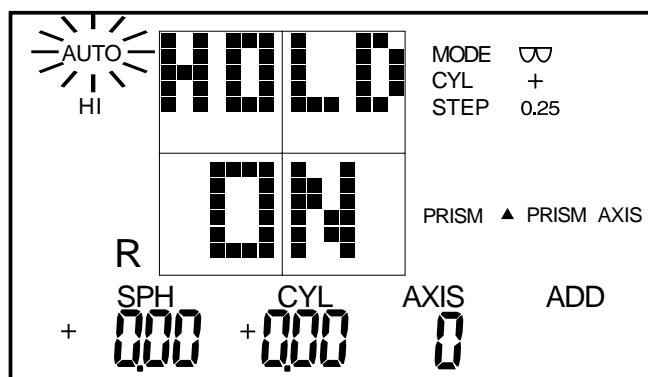


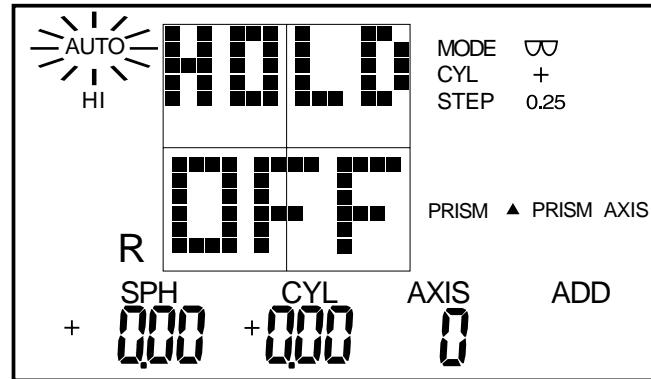
e. AUTO HOLD

ON: AUTO HOLD mode will be in effect when the unit is turned on.

OFF: MANUAL mode will be in effect when the unit is turned on.

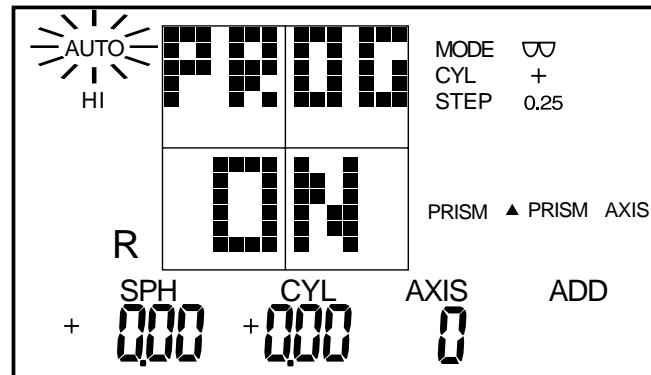
The "AUTO" indicator flashes to prompt the next setting. As previously, press the READING button to select the setting for each parameter and press the MODE button to proceed to the next parameter.





f. AUTO PROG

- ON: Automatic activation of the MULTI-FOCAL mode when a progressive addition is detected.
- OFF: MULTI-FOCAL mode is not automatically activated when a progressive addition is detected.



5) Press the HOLD button when setup is complete.

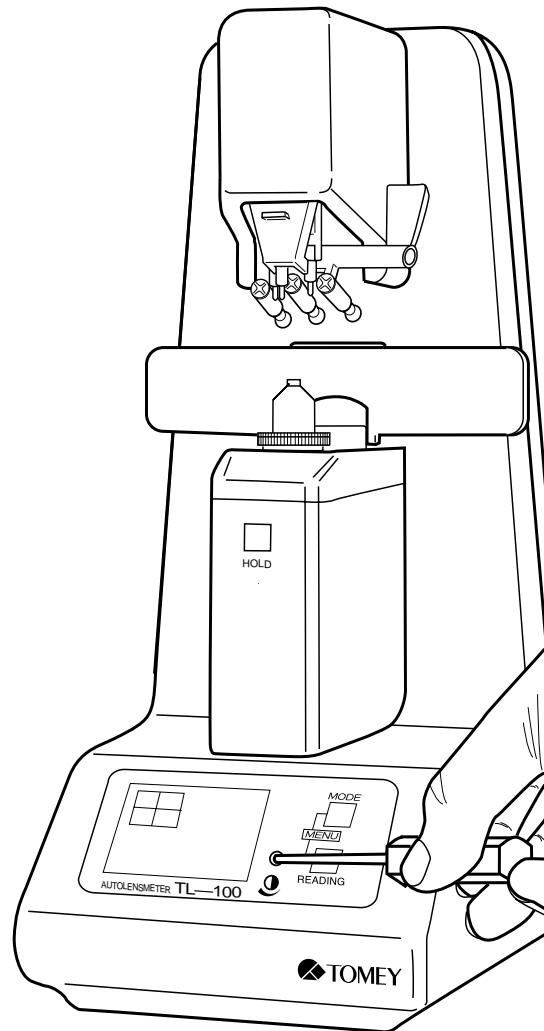
The initial measurement screen appears.

Notes

- All settings are saved in non-volatile memory and will not be lost when the power is turned off. It is not necessary to set them every time the unit is turned on.
- To change the settings, repeat the above procedures.
- When in Setup mode, if the instrument is not used for more than 3 minutes, it automatically returns to Measurement mode.

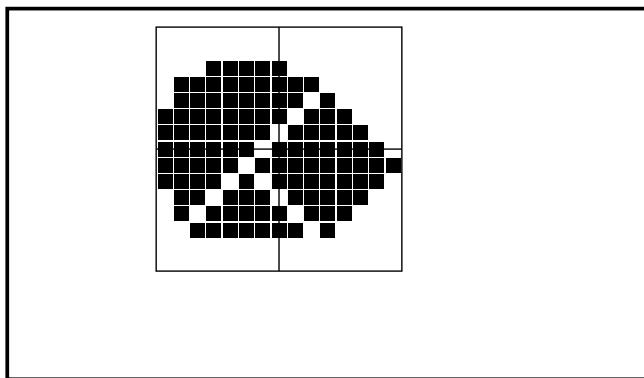
3.5 LCD CONTRAST ADJUSTMENT

The contrast of the LCD (Liquid Crystal Display) can be modified by turning the contrast adjuster on the front panel with a Phillips screwdriver.



3.6 AUTOMATIC POWER SAVING FUNCTION (AUTO POWER OFF)

- 1) When the instrument is not in use for more than 10 minutes (i.e., when no lens has been placed in the nose piece and no buttons have been pressed), the built-in motor and the internal light source will go off automatically. The following will be displayed:



- 2) Press any button to reactivate the instrument.

Note

- Turn off the power switch when you do not intend to use the instrument for a long period of time.

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4. MAINTENANCE AND INSPECTION

4.1 WARRANTY

One-Year Limited Warranty

The Seller warrants this product to be free from defects in material and workmanship under the normal use of this product for one year or other term complying with local regulations from the date of invoice issued by Seller to the original purchaser.

This warranty shall apply only to the original purchaser and shall not, in any way, be transferable or assignable to any other party than the original purchaser.

Lamps, paper and other consumable items shall not be covered by this warranty.

This warranty also shall NOT apply if the product has not been installed, operated or maintained in accordance with the OPERATOR MANUAL of Tomey Corporation (hereinafter called "Tomey"). Neither Seller nor Tomey shall be liable for any damages caused by purchaser's failure to follow instructions for proper installation, use and maintenance of the product.

This warranty is only applicable to the new product and DOES NOT cover any damage resulting from or caused by accident or negligence, abuse, misuse, mishandling, improper installation, improper repair or improper modification of this product, by persons other than personnel duly authorized by Tomey, nor to a product whose serial number or batch number is removed, altered or effaced.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING SPECIFICALLY, WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND ALL OTHER OBLIGATION AND LIABILITY ON THE PART OF SELLER AND TOMEY. NEITHER SELLER NOR TOMEY SHALL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES UNDER ANY CIRCUMSTANCES OR FOR MORE THAN REPAIR, REPLACEMENT OR REFUND OF THE PURCHASE PRICE OF DEFECTIVE GOODS.

4.2 ROUTINE MAINTENANCE

- Do not touch the optical elements, such as the cover glass, with your fingers. Keep them clean. Accuracy of the reading may be adversely affected by dust or dirt.
- Keep the dust cover over the instrument when the instrument is not in immediate use.
- Use a dry cloth to clean the cover, screen and the front panel. Use diluted non-organic detergents for any heavy stains. Do not use organic solvents, such as thinners, which may cause damage to the surface of the instrument.
- Disconnect the power cord if you do not plan to use the instrument for a long time.

4.2.1 CLEANING COVER GLASS

Clean the cover glass periodically.

- 1) Remove the nose piece.
- 2) Clean the cover glass as follows:

Remove the dust on the cover glass using a blower (i.e., compressed air). If the dirt still remains, gently wipe it off using a soft cloth or lens cleaning accessories.



- **Scratches on the cover glass may result in inaccurate readings.**

4.3 Replacing spare parts

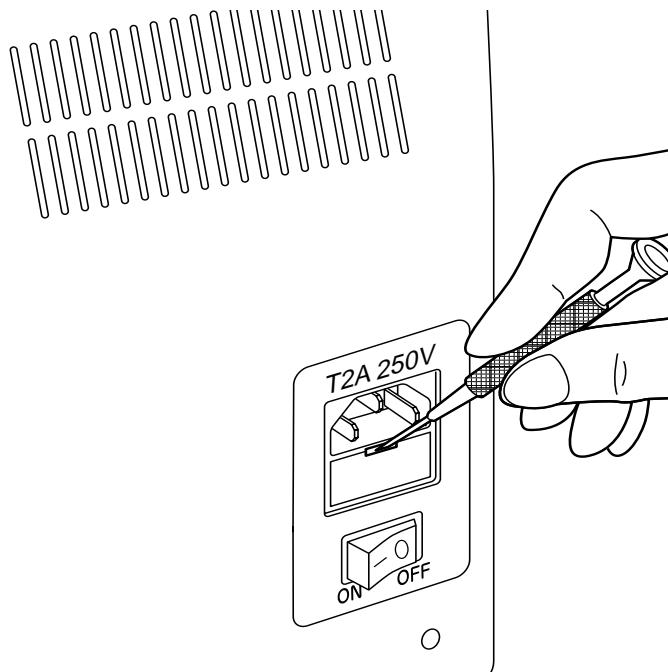
4.3.1 FUSE

It may be necessary to replace the fuse if the instrument panel does not light up when the power is turned on.



- **Disconnect the power cord immediately if problems persist after replacing the fuses. Contact your Tomey representative or local distributor.**

- 1) Turn off the power.
- 2) Unplug the power cord.
- 3) As shown in the diagram below, remove the cover of the fuse holder on the back side of the unit using a flat screwdriver.
- 4) Remove the defective fuse from the fuse holder.
- 5) Place a new fuse into the fuse holder.
- 6) Push the fuse holder back in place.



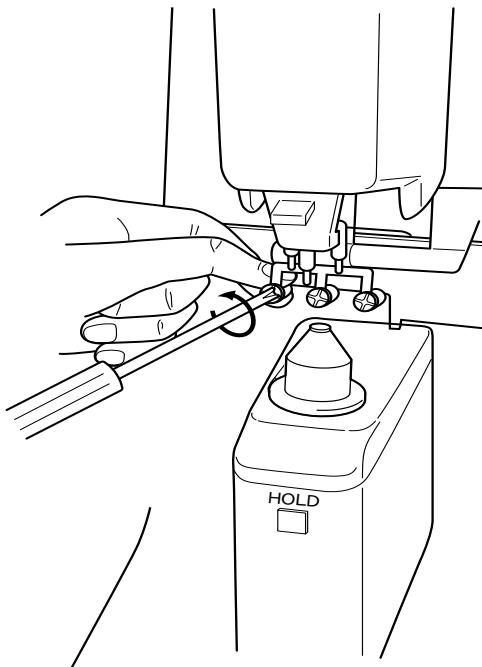
4.3.2 INK CARTRIDGE

Replace the ink cartridge with a new one when ink is low. Replacement cartridges can be obtained from your Tomey representative or local distributor.

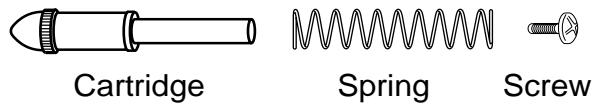
Note

- Be sure to use genuine ink cartridges (as specified in this manual).

- 1) Lift up the lens clamp.
- 2) Pull the marking device straight downward by its handle and continue to hold it down. (If you let go, it will spring back up).
- 3) While holding the ink cartridge down, remove the screw on each cartridge by turning it counter clockwise using a Philips screwdriver.



-
- 4) Remove the ink cartridge and the spring from the marking device.
 - 5) Place a new ink cartridge in the marking device and replace the spring.



- 6) Firmly attach the cartridge to the marking device with the screw.



- **Do not touch the tip of the pen while replacing the ink cartridge. Touching the tip may result in damage to the tip of the pen and the dots marked on the lens may not be accurate.**
- **Fastening the screw too tightly may result in damage to the ink cartridge. Use the accompanying screws and springs only. If the screws and/or the springs are lost , contact your Tomey representative or local distributor.**

4.4 STORAGE



- Do not store this instrument in a location where it might be exposed to water.
- Avoid excessive atmospheric pressure, high temperature, excessive humidity, poor ventilation, direct sunlight, dust, salt or sulfur in the air.
- Ascertain that factors such as excessive slope, vibration and impact will not endanger the instrument (including during transportation).
- Do not store this instrument near chemical substances or in a location where the gas may be generated.

4.5 PACKING MATERIALS



- Keep the containers and packing materials for future use.
- If you discard the packing materials, be sure to comply with local ordinances and regulations.

5. TROUBLESHOOTING

Before calling service personnel, restart the unit (turn power OFF, then ON) and check the following.

Notes

- **Do not attempt measures other than those described below.**
- **If the problems persist after checking the following, stop using the unit and immediately contact your Tomey representative for inspection or repair.**

5.1 TROUBLESHOOTING GUIDE

5.1.1 GENERAL OPERATION

1) The LCD does not Light Up After Turning ON.

Cause 1: Failure in connecting the power cord.

Action: Insert the female end of the power cord securely into the AC power terminal of the instrument.

Insert the male end of the power cord securely into an AC outlet.

Cause 2: The fuse is blown.

Action: Replace with a new fuse (See Section 4.3.1, Fuse)

Cause 3: Improper adjustment of the screen contrast.

Action: Adjust the contrast of the screen properly by using the contrast adjuster on the lower right of the operation panel (See Section 3.5, Controlling the LCD contrast).

2) Freezes at the Initial Screen.

Cause 1: There was an object on the nose piece when the instrument was turned ON.

Action: Remove the object from the nose piece and press any button.

Cause 2: The nose piece is not seated properly.

Action: Seat the nose piece properly and press any button.

Cause 3: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and then clean the cover glass (See Section 4.2.1, Cleaning cover glass). Replace the nose piece and turn the power on again.

3) "INITIAL ERR!" is Displayed.

Cause 1: A lens was on the nose piece when the power was turned on.

Action: Remove the lens and press any button.

Cause 2: The nose piece is not seated properly.

Action: Seat the nose piece properly and press any button.

Cause 3: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and clean the cover glass (see Section 4.2.1, Cleaning cover glass). Replace the nose piece and turn the power on again.

4) a) The Sph, Cyl or Axis value is not ZERO (0.00) with No Lens on the Nose Piece.

b) The Readings are Inaccurate.

Cause 1: The nose piece is not seated properly.

Action: Seat the nose piece properly.

Cause 2: The cover glass under the nose piece is not clean.

Action: Turn off the power. Remove the nose piece and clean the cover glass (See Section 4.2.1, Cleaning cover glass). Replace the nose piece and turn the power on again.

5.1.2 Progressive Addition Lens Measurement

1) The Cursor Cannot be Centered in the Progressive Channel.

Cause 1: With progressive lenses which have a small power difference between the far point area and the near point area, aligning the cursor to the center may not be achievable.

Action : The beginning of the progressive channel is located in approximately the center of the lens or the center of the frame. Take measurement around that position and press the HOLD button.

2) The Cursor Cannot be Centered in the Far Point Area.

Cause 1: Progressive lenses are sometimes dispensed for intermediate and near correction only. In such lenses, the progressive area extends into the far point area and it is difficult to accurately measure the far point area.

Action: Take a reading near the top of lens.

Slightly move the lens back and forth, right and left, near the central top portion of the lens. Regard the area where the SPH value varies the least as the measurement of the far point area. Press the HOLD button when this location is found.

3) The Near Point Area is not Detected. (The Cursor does not Change to "■■■" or "■■■".)

Cause 1: The near point area is NOT automatically detected if the ADD power is less than 1.0 diopter.

Action: Press the HOLD button when judging the highest addition value when the cursor is in the progressive zone.

Cause 2: The near point area in frame lenses with a long progressive zone may be positioned very near the edge of the frame or even outside of the frame. It may not be possible to detect the near point in such lenses.

Action: Press the HOLD button when judging the highest addition value when the cursor is in the progressive zone.

Cause 3: The near point area in a small frame lens may be positioned very near to the edge of the frame or even outside of the frame. It may not be possible to detect the near point area in such lenses.

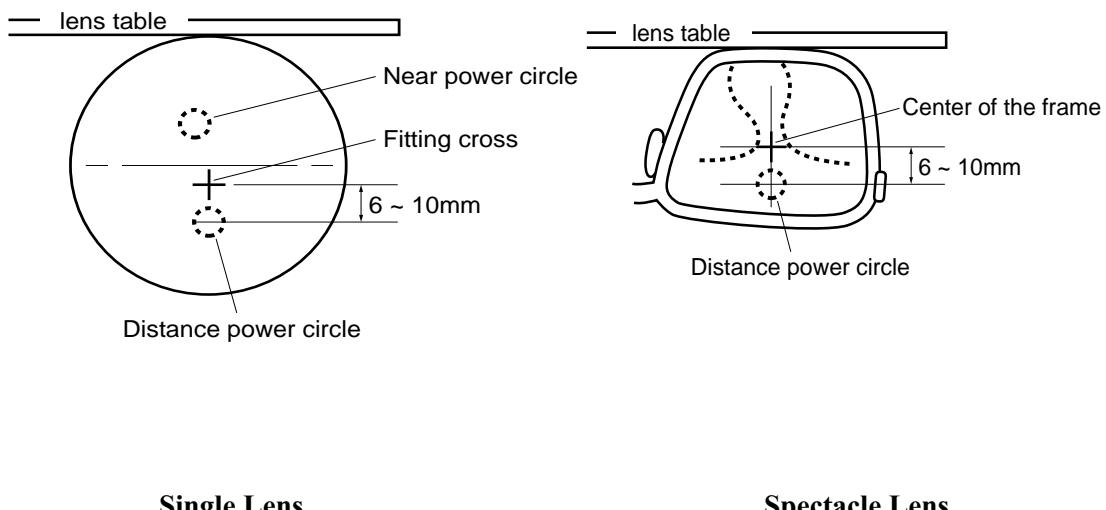
Action: Press HOLD button when judging the highest addition value when the cursor is in the progressive zone.

4) The ADD Readings are Significantly Lower (> 0.5 diopters) than the Nominal Values.

Cause 1: The far point area was not measured properly.

Action : With some lenses, the far point area may not be measured accurately if AUTO HOLD mode is used. Disable the AUTO HOLD mode in Setup (See Section 3.4, Setup Menu 3), and measure the far point area manually. If it is still difficult to measure, slightly move the lens back and forth, right and left to measure the portion where variation of SPH readings is minimum and press the HOLD button.

Measurement Position of the Far Point Area



Single Lens

Spectacle Lens

Cause 2 : TL-100 senses refractive power change along the progressive extent. If the power change is close to 0 diopter, the TL-100 treats it as a near point.

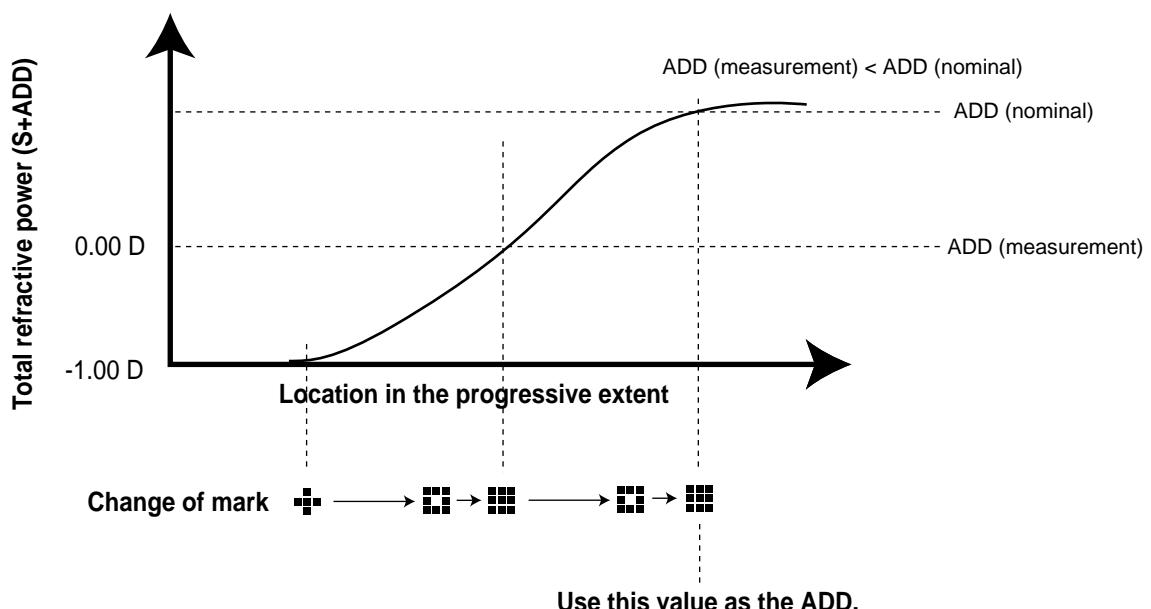
Example:

When a lens with a SPH reading of -1.00 diopters and an add reading of 2.00 diopters is measured, there is a point where the total refractive power ($S + ADD$) equals zero (0) diopters. As a result, the ADD value would be displayed as 1.00 diopter.

Action : Use manual mode for these lenses.

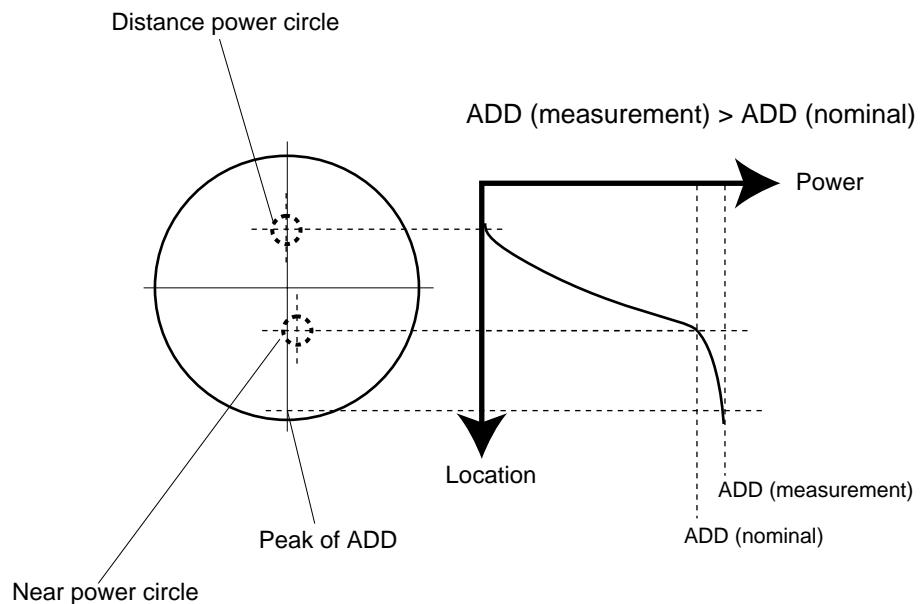
If the cursor changes twice from “+” to “” (or “”), use the highest reading as the ADD.

If the cursor changes only once to “” take the highest reading as the ADD.



5) The ADD Readings are Higher than the Nominal Value.

Cause: Some progressive lenses may have a peak of ADD below the near power circle. With these lenses, the ADD readings may be higher than the nominal values.

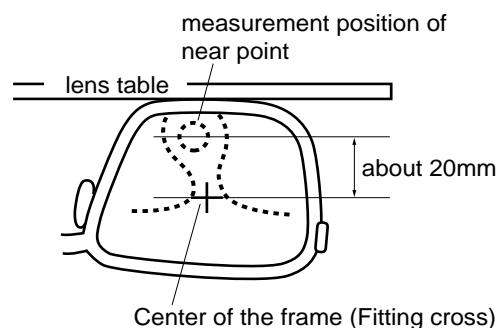


Action: The ADD reading should be taken at the near point marked on the lens blank. (The cursor may not change to "■■■".)

After dispensing, marking do not exist. Read the ADD at a spot located 20 mm below the center of the frame. (See diagram below.) Note that in small frames, this location may be beyond the extent of the frame.

In either case, make sure to take the ADD reading while the cursor stays in the progressive zone.

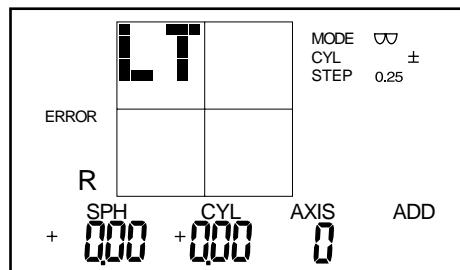
The Measurement Position of the Near Point



5.2 Error Messages

1) ERROR LT

Cause: Amount of Light is not Sufficient.



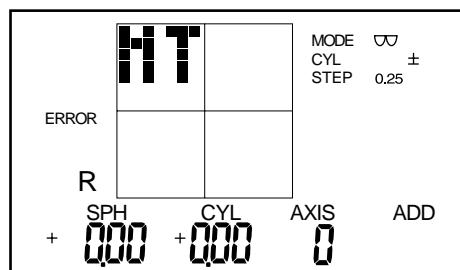
Action: Clean both the lens to be measured and the cover glass located under the nose piece.

It may not be possible to measure heavily tinted lenses.

Make sure that the frame of the spectacle does not cover the nose piece.

2) ERROR MT

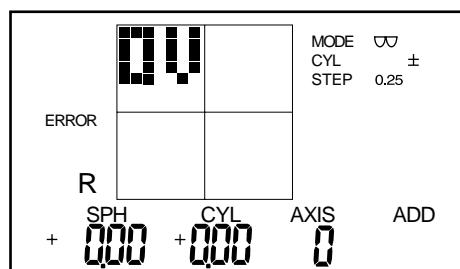
Cause: Malfunction of the DC Motor.



Action: Contact your Tomey representative or local distributor.

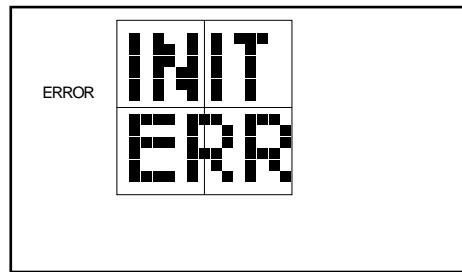
3) ERROR OV

Cause: Over/Under Flow



Action: The power of the lens is out of the measuring range.

4) ERROR INIT ERR



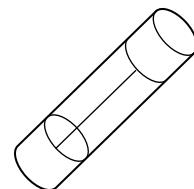
Action:

1. Remove the lens from the nose piece, and press any button.
2. Make sure the nose piece is seated properly and press any button.
3. Clean the cover glass located under the nose piece and press any button.

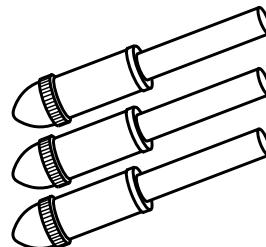
6. SPARE PARTS

The following spare parts can be purchased from your Tomey representative or local distributor.

- Spare fuse (250V, 2.0A)



- Ink cartridges



- Dust cover

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7. SPECIFICATIONS

7.1 MEASUREMENT

- Range
 - Spherical power (S reading): ± 25D
 - Cylindrical power (C reading): ±9.99D
 - Axis of cylindrical power (A reading): 0 to 180 degrees
 - Addition reading (ADD reading): 0 to 9.99 D
 - Prism power (P reading): 0 to 9.99 Δ
- Steps
 - Power: 0.01/0.12/0.25 D
 - Prism: 0.01/0.12/0.25 Δ
- Modes
 - Cylinder: + / ± / -
 - Prism: Rectangular/Polar coordinates
- Sampling speed: 0.035 seconds
- Measurement wavelength: 660 nm
- Diameter of the beam: 3 mm
- Lens diameter: 20 to 100 mm
- Lens types: Spectacles, soft and hard contact lenses
- Abbe numbers: 30 to 60 (5-unit increment)
(30,35,40,45,50,55,60)

7.2 DATA CONTROL

- Display: Two dimensional LCD display with back light
(character type)
- Alignment: Cross cursor
(Thickens when lens is aligned)

7.3 PHYSICAL DIMENSIONS AND ELECTRICAL REQUIREMENTS

- Dimensions: 200 (W) x 260 (D) x 436 (H) mm
[7.9 (W) x 10.2 (D) x 17.2 (H) in]
- Weight: approx. 5.0 Kg (11.0 lbs)
- Main supply voltage: 100 to 240 V AC
(automatically adjusted)
- Power consumption: 35 VA
- Frequency: 50/60 Hz

7.4 ENVIRONMENTAL CONDITIONS

- Installation site: indoors
- Operating temperature range: +10°C to + 40°C (+50 °F to +104°F)
maximum relative humidity 80% for
temperatures up to 31°C decreasing
linearly to 50% relative humidity at
40°C
- Main supply voltage fluctuations: ±10% of the normal voltage
- Installation Category: II
- Pollution degree: 2 (based on IEC664)

7.5 APPROVED INTERNATIONAL STANDARDS

- Electrical safety: IEC -1010-1; +A1; +A2
- Electromagnetic compatibility: EN61326
IEC61000-3-2
IEC61000-3-3
FCC (Part 15 Class B)

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